

Review article

Review of the Genera *Delomerista*, *Iseropus*, and *Perithous* (Hymenoptera: Ichneumonidae: Pimplinae) from South Korea

Geun-Myeong Song¹, Jin-Kyung Choi², Jong-Wook Lee^{1,*}

¹Department of Life Sciences, Yeungnam University, Gyeongsan 38541, Korea

²Department of Science Education, Daegu National University of Education, Daegu 42411, Korea

ABSTRACT

The eight newly recognized species of the genera *Delomerista*, *Iseropus*, and *Perithous* are reported in this study: *Delomerista kusuoi* Uchida & Momoi, 1957, *D. mandibularis* (Gravenhorst, 1829), *D. pfankuchi* Brauns, 1905, *Iseropus stercorator stercorator* (Fabricius, 1793), *Perithous albicinctus* (Gravenhorst, 1829), *P. septemcinctarius* (Thunberg, 1822), *P. speculator* Haupt, 1954, and *P. townesorum* (Gupta, 1982). The genus *Delomerista* Förster, 1869 is a small group that includes 18 species worldwide that, for the first time, has been recorded from South Korea. *Iseropus* Förster, 1869 is a small group that includes nine species worldwide. The genus *Perithous* Holmgren, 1859 is also small group including 18 species worldwide. In this study, keys to species of these genera and illustrations and diagnoses of each species are provided.

Keywords: Eastern Palaearctic, *Delomerista*, *Iseropus*, *Perithous*, taxonomy

INTRODUCTION

The tribe Delomeristini (Hymenoptera: Ichneumonidae) is the smallest group of the subfamily Pimplinae and currently includes 38 species in three genera worldwide. Among them, the genus *Delomerista* Förster, 1869 is moderately sized group that includes 18 species worldwide, 10 of which inhabit the Eastern Palaearctic region: two species are distributed in China, eight in Russia, and three in Japan (Yu et al., 2016). Herein, members of the South Korean *Delomerista* group are recorded for the first time. Species of this genus are ectoparasitoids of Hymenoptera, Lepidoptera, and Coleoptera (Richmond et al., 1995; He et al., 1996) with oviposition occurring in the prepupae of the hosts (Furniss and Dowden, 1941). Another genus from the tribe Delomeristini genus *Perithous* Holmgren, 1859 includes 18 species worldwide. Seven species are distributed in the Eastern Palaearctic region. Four species are distributed in China and Russia, and three in Japan (Yu et al., 2016). A taxonomic study of South Korean *Perithous* Holmgren, 1859 was initiated by Kim (1955), who reported only one species, *Perithous scurra japonicas* Uchida, 1928. For the next 60 years, the South Korean *Perithous* re-

ceived very little attention, and no additional records had been reported. *Perithous* species are ectoparasitoids such as the species from the genus *Delomerista* (Danks, 1970; Tomos et al., 1999; Sheng et al., 2002).

The tribe Ephialtini is the largest group within the subfamily Pimplinae and currently includes 963 species in 59 genera worldwide. The genus *Iseropus* Förster, 1869 is a small group including nine species worldwide, two species inhabit the Eastern Palaearctic region: one species has been recorded from China, and each two from Russia and Japan (Yu et al., 2016). A taxonomic study of South Korean *Iseropus* Förster, 1869 was initiated by Uchida (1928), who reported only one species, *Iseropus orientalis* Uchida, 1928. For the next 80 years, there are no additional records of species under the genus *Iseropus*. Species of *Iseropus* are idiobionts, endoparasitoids, and ectoparasitoids of Lepidoptera, Hymenoptera, Diptera, and Coleoptera (Kasparyan, 2006; Hamiti et al., 2011).

In the present study, we report eight new species records for South Korea: *Delomerista kusuoi* Uchida & Momoi, 1957, *D. mandibularis* (Gravenhorst, 1829), *D. pfankuchi* Brauns, 1905, *Iseropus stercorator stercorator* (Fabricius, 1793),

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*To whom correspondence should be addressed
Tel: 82-53-810-2376, Fax: 82-53-811-2376
E-mail: jwlee1@ynu.ac.kr

Perithous albicinctus (Gravenhorst, 1829), *P. septemcinctarius* (Thunberg, 1822), *P. speculator* Haupt, 1954, and *P. townesorum* (Gupta, 1982). We provide diagnoses and illustrations, and keys to the South Korean *Delomerista*, *Iseropus*, and *Perithous* species.

MATERIALS AND METHODS

Materials used in this study were collected by sweeping and using Malaise trap, after which they were deposited in the Animal Systematic Laboratory of Yeungnam University (YNU, Gyeongsan, South Korea). Morphological terminology follows that of Townes (1969). Specimens were examined using an AxioCam MRc5 camera attached to a stereo microscope (Zeiss Stereo Discovery, V20; Carl Zeiss, Göttingen, Germany), processed using AxioVision SE64 software (Carl Zeiss), and optimized with a Delta imaging system (i-solution; IMT i-Solution Inc., Vancouver, Canada). Distributional data follows that of Yu et al. (2016).

Abbreviations for collections are as follows: AEI, American Entomological Institute, Gainesville, Florida, U.S.A. (H. Townes collection.); BMNH, The Natural History Museum, Department of Entomology, Cromwell Road, London, England, United Kingdom; DEI, Deutsches Entomologisches Institut, Eberswalde, Germany; HINZ, Zoologisches Staatsammlung, München, Germany. (R. Hinz collection.); HU, Hokkaido University, Faculty of Agriculture, Entomological Institute, Sapporo, Japan; IZU, Instytut Zoologiczny Uniwersytetu, Wrocław, Poland (Gravenhorst collection); USNM, United States National Museum of Natural History, Smithsonian Institute, Washington, D.C., USA; UU, Uppsala Universitet, Zoologiska Institutionen, Entomologiska Avdelningen, Uppsala, Sweden. (Thunberg collection.); UZM, Universitets Zoologiske Museum, Copenhagen, Denmark; ZMHU, Zoologisches Museum (Museum für Naturkunde), Humboldt Universität, Berlin, Germany.

Abbreviations of South Korean provinces and species information used in the paper as follows: CB, Chungcheongbuk-do; GB, Gyeongsangbuk-do; GG, Gyeonggi-do; GN, Gyeongsangnam-do; GW, Gangwon-do; JB, Jeollabuk-do; JN, Jeollanam-do; TD, type depository; TL, type locality; TS, type species.

SYSTEMATIC ACCOUNTS

Order Hymenoptera Linnaeus, 1758

Family Ichneumonidae Latreille, 1802

Subfamily Pimplinae Wesmael, 1845

^{1*}Tribe Delomeristini Hellén, 1915

^{2*}Genus *Delomerista* Förster, 1869

Delomerista Förster, 1869: 164. TS: *Pimpla mandibularis* Gravenhorst; TD: IZU.

Diagnosis. Malar space of female whitish. Second to fifth tergites matt, sometimes obscurely and finely punctate, without white part on posterior edge.

Key to species of the genus *Delomerista* from South Korea

1. Ovipositor with pointed apical part of upper valve. Tapering part of upper valve of ovipositor 5–7 times longer than height of the apical part. Upper part between median and lateral parts of face with a yellowish-brown marks (Fig. 3C)..... *D. pfankuchi* Brauns, 1905 (Fig. 3)
- Ovipositor with blunt apical part of upper valve. Tapering part of upper valve of ovipositor 2–3 times longer than height of the apical part. Upper part between median and lateral parts of face black (Figs. 1C, 2C)..... 2 (Figs. 1, 2)
2. Marks on inner orbits of face brown and convergent from median to lower part (Fig. 1C).....
..... *D. kusuoi* Uchida & Momoi, 1957 (Fig. 1)
- Marks on inner orbits of face dark brown and sub-parallel from sub-lower to lower part (Fig. 2C)
..... *D. mandibularis* (Gravenhorst, 1829) (Fig. 2)

^{3*}*Delomerista kusuoi* Uchida & Momoi, 1957 (Fig. 1)

Delomerista kusuoi Uchida & Momoi, 1957: 10. Type: ♀;
TL: Japan; TD: HU.

Material examined. South Korea: 1♀, GW: Wonju-si, Gwirae-myeon, 5 May 2005, Yoo KE, Cho RH.

Diagnosis. Antenna with 27 flagellomeres. First flagellomere 5.1 times as long as basal width. Second flagellomere 4.4 times as long as basal width. Third flagellomere 3.9 times as long as basal width. Fourth flagellomere 3.7 times as long as basal width. Fifth flagellomere 3.5 times as long as basal width. Antero-upper and lower-median parts of pronotum indistinctly and diagonally rugose. Lateral-anterior and dorso-median lateral and postero-lateral parts of propodeum densely punctate, with dense hairs (Fig. 1D). Hind basitarsus 6.4 times as long as apical width. Second hind tarsomere 3.8 times as long as apical width. Third hind tarsomere 2.6 times as long as apical width. Fourth hind tarsomere as long as apical width. Fifth hind tarsomere 3.1 times as long as apical width.

Color. Dorso-apical parts of basal first to seventh flagel-

Korean name: ^{1*}주름납작맵시벌족(신칭), ^{2*}주름납작맵시벌속(신칭), ^{3*}원주주름납작맵시벌(신칭)

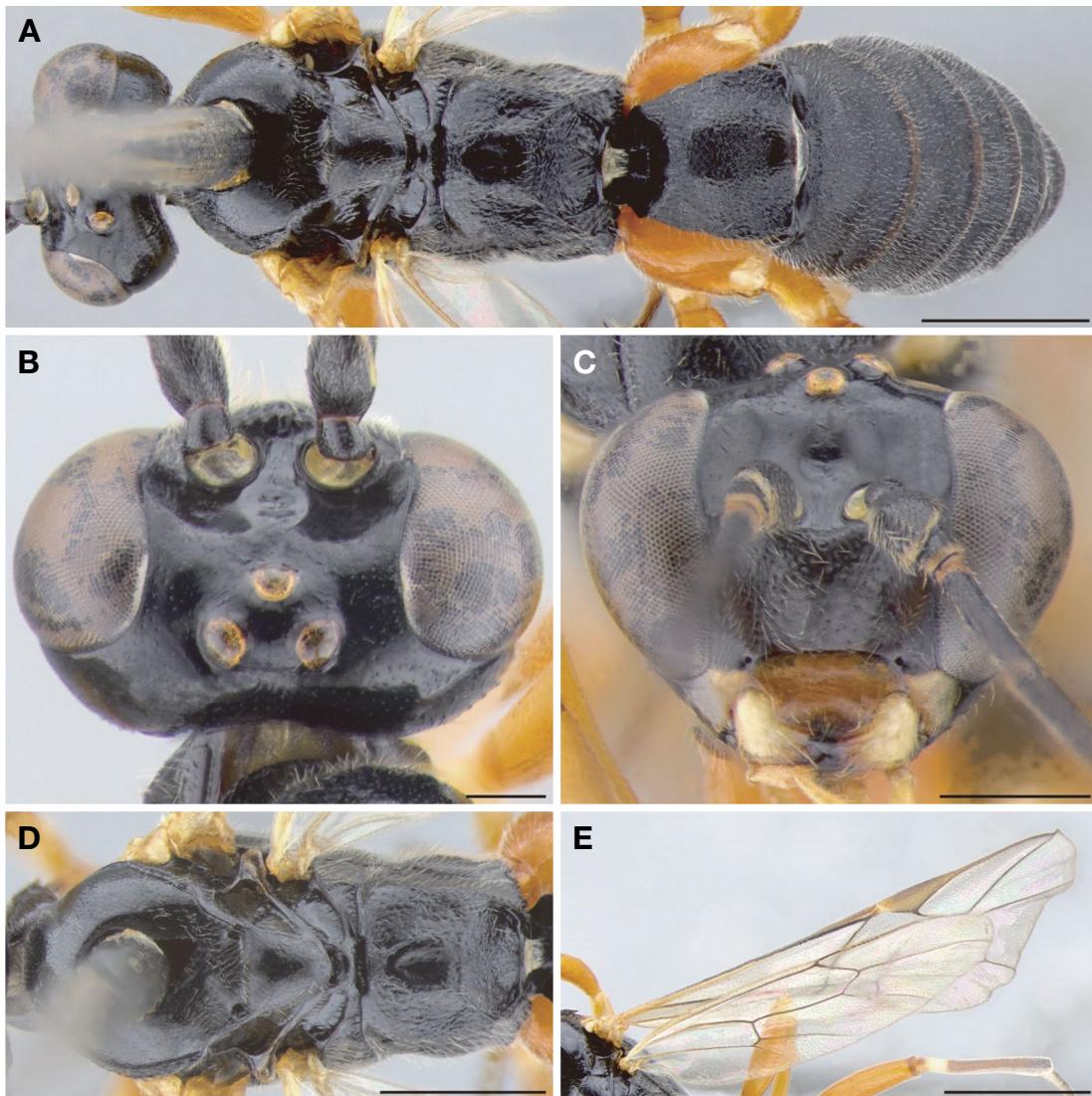


Fig. 1. A–E, *Delomerista kusuo* Uchida & Momoi, 1957, female. A, Habitus in dorsal view; B, Head in dorsal view; C, Head in frontal view; D, Mesosoma in dorsal view; E, Wings. Scale bars: A, D=1 mm, B=0.2 mm, C=0.5 mm, E=2 mm.

lomeres, dorso-median and longitudinal parts of basal eighth to 15th flagellomeres, postero-median parts of second and fourth tergites and posterior part of third tergite brown (Fig. 1A).

Distribution. South Korea (new record), Japan.

Region. Eastern Palaearctic.

Remarks. This species is similar to other species of this genus. However, marks on inner orbits of face is brown and distinctly convergent from median to lower part (Fig. 1C).

^{1*}***Delomerista mandibularis* (Gravenhorst, 1829) (Fig. 2)**
Pimpla mandibularis Gravenhorst, 1829: 180. Lectotype: ♀;

TL: Poland; TD: IZU.

Ephialtes albicinctus Desvignes, 1862: 226. Type: ♂; TL: United Kingdom; TD: BMNH.

Ephialtes desvignesii Marshall, 1870: 20. New name for primary homonym *Ephialtes albicinctus* Desvignes, 1862; Type: unknown; TL: unknown; TD: unknown.

Delomerista excavata Ulbricht, 1913: 8. Type: ♀; TL: Germany; TD: unknown.

Delomerista borealis Walkley, 1960: 370. Holotype: ♀; TL: U.S.A.-Alaska; TD: USNM.

Delomerista gelida Walkley, 1960: 365. Holotype: ♀; TL: Canada-Northwest Territories; TD: USNM.

Korean name: ^{1*}큰턱주름납작맵시벌(신칭)

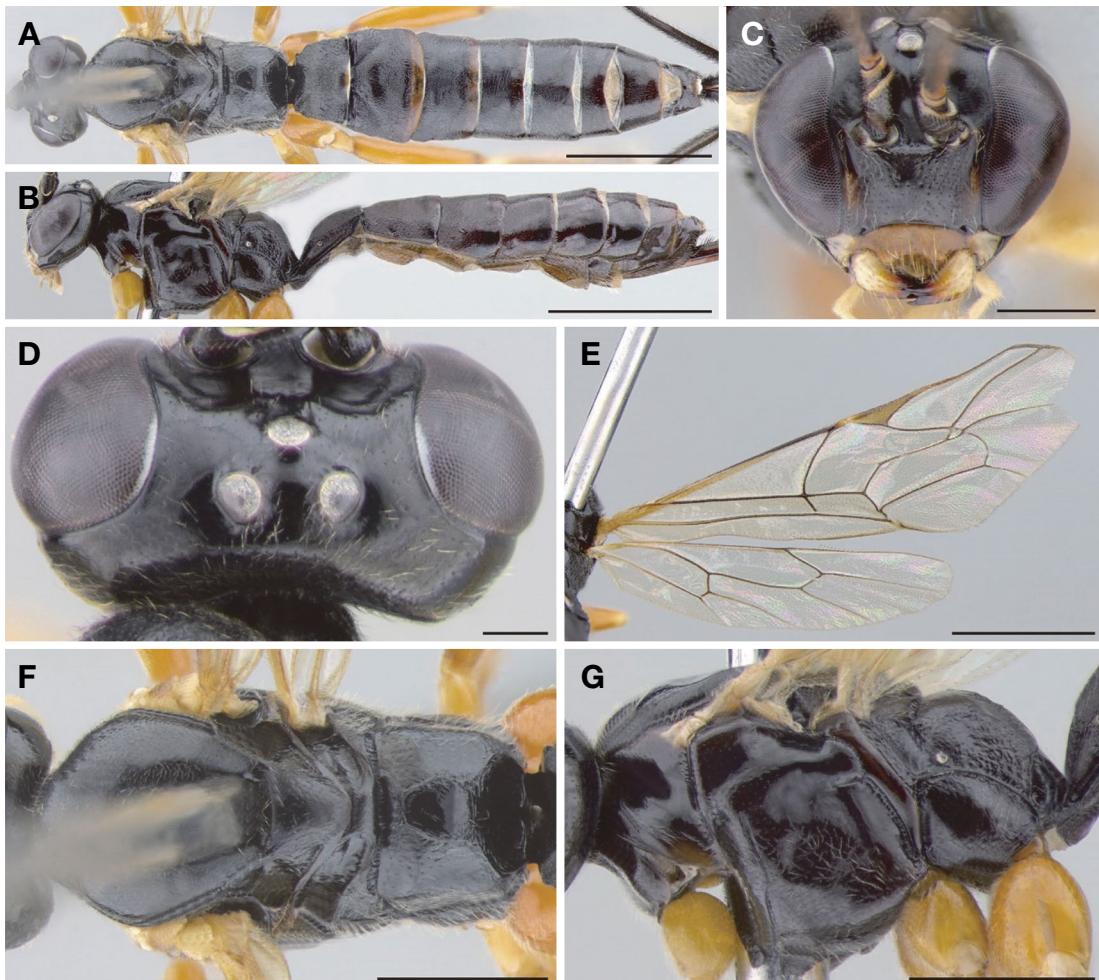


Fig. 2. A-G, *Delomerista mandibularis* (Gravenhorst, 1829), female. A, Habitus in dorsal view; B, Habitus in lateral view; C, Head in frontal view; D, Head in dorsal view; E, Wings; F, Mesosoma in dorsal view; G, Mesosoma in lateral view. Scale bars: A, B, E=2 mm, C=0.5 mm, D=0.2 mm, F, G=1 mm.

Material examined. South Korea: GG: 2♀, Namyangju-si, Mt. Cheonmasan, 30 May 1971, Lee SM; 1♀, Namyangju-si, Gwangneung, 17 May 1986, Lee YJ; 1♀, Hanam-si, Namhansanseong, 18 May 1997, Yu JY; 1♀, Seongnam-si, Mt. Namhansan, 30 May 1999, Bae MH; Seoul: 1♀, Nowon-gu, Hagye-dong, 13 May 1998, Jo SH; 1♀, Dobong-gu, Dobong-dong, Mt. Dobongsan, 19 May 1991, Lim EM; 1♀, ditto, 22 May 1997, Kim HJ; 1♀, Seocho-gu, Naegok-dong, Heonin reung, 24 May 1986, Go HS; GW: 1♀, Goseong-gun, Ganseong-eup, Geonbongsa temple, 22 May 1992, Lee JW; 1♀, Yanggu-gun, Dong-myeon, Satae-ri, Gachilbong, 31 May 1992, Lee JW; CB: 1♀, Goesan-gun, Cheongcheon-myeon, Hwayang-ri, 25 May 1996; JB: 1♀, Muju-gun, Seolcheon-myeon, Samgong-ri, 24 May 1993, Yun EY; JN: 1♀, Wando-gun, Bogil-myeon, Bogil Island, 11 May 1996, Kim MS; 1♀, ditto, 12 May 1996, Lim IS.

Diagnosis. Antenna with 27–31 flagellomeres. First flagellomere 4.5 times as long as basal width. Second flagellomere 4.0 times as long as basal width. Third flagellomere 3.8 times as long as basal width. Fourth flagellomere 3.4 times as long as basal width. Fifth flagellomere 3.3 times as long as basal width. Antero-lower part of pronotum indistinctly and diagonally rugose (Fig. 2G). Lateral-median and dorso-median lateral parts of propodeum densely punctate, with dense hairs (Fig. 2F, G). Hind basitarsus 8.8 times as long as apical width. Second hind tarsomere 4.4 times as long as apical width. Third hind tarsomere 2.8 times as long as apical width. Fourth hind tarsomere 1.2 times as long as apical width. Fifth hind tarsomere 3.3 times as long as apical width.

Color. Ventral-apical part of apical first flagellomere, dorso-basal to sub-apical parts of basal first to fifth flagellomeres, dorsal parts of basal sixth to apical first flagellomeres and

postero-median parts of first to fourth tergites brown (Fig. 2A, B).

Distribution. South Korea (new record), Austria, Belgium, Bulgaria, Canada, Czech Republic, Estonia, Finland, France, Germany, Hungary, Ireland, Italy, Japan, Latvia, Norway, Poland, Romania, Russia (Astrakhanskaya Oblast, Buryatskaya Respublika, Chita Oblast, Khabarovsk Kray, Komi Respublika, Krasnoyarsk Kray, Magadanskaya Oblast, Murmansk Oblast, Sakhalin Oblast, Sankt Petersburg, Sverdlovsk Oblast, Tomsk Oblast, Tyumen Oblast, Voronezhskaya Oblast), Slovakia, Sweden, Switzerland, Turkey, U.S.A., Ukraine, United Kingdom, Yugoslavia.

Region. Holarctic, Nearctic.

Remarks. Dissimilarly to *D. kusuoi* Uchida & Momoi, 1957, marks on inner orbits of face is dark brown and indistinctly convergent from sub-lower to lower part (Fig. 2C).

^{1*}*Delomerista pfankuchi* Brauns, 1905 (Fig. 3)

Delomerista pfankuchi Brauns, 1905: 131. Type: ♀; TL: Germany; TD: ZMHU.

Troctocerus unicolor Hedwig, 1959: 96. Type: ♀; TL: Germany; TD: HINZ.

Material examined. South Korea: GG: 1♀, Yangpyeong-gun, Yongmun-myeon, Yeonsu-ri, Mt. Yongmunsan, M.T.II, alt. 324 m, 37°31'49.5"N, 127°34'18.8"E, 11–25 Jun 2009, Lim JO; GW: 1♀, Wonju-si, Heungeop-myeon, Maeji-ri, Yensei Univ., Ungdeongi, 37°16'54.49"N, 127°53'54.54"E, 21 Apr–7 May 2015, Han HY; 1♀, Taebaek-si, Taebaeksan-ro, 4246–167, Yuilsa temple, M.T., 20 Jun–11 Aug 1999, Gu DS; Daejeon: 1♀, Dong-gu, Yongun-dong, 9 May 1994, Baek EK; GB: 1♂, Gyeongsan-si, Dae-dong, Yeungnam Univ., 35°49'46"N, 128°45'10"E, 13 Apr 2009, Kim DY.

Diagnosis. Antenna with 34–38 flagellomeres. First flagellomere 5.1 times as long as basal width. Second flagellomere 2.7 times as long as basal width. Third flagellomere 2.6 times as long as basal width. Fourth flagellomere 2.5 times as long as basal width. Fifth flagellomere 2.4 times as long as basal width. Postero sub-upper to lower part of pronotum indistinctly and transversely rugose (Fig. 3G). Lateral-median, dorso-antero lateral, and median-lateral parts between latero-median longitudinal carinae of propodeum densely punctate, with dense hairs (Fig. 3F, G). Hind basitarsus 5.9 times as long as apical width. Second hind tarsomere 3.3 times as long as apical width. Third hind tarsomere 3.0 times as long as apical width. Fourth hind tarsomere 1.8 times as long as apical width. Fifth hind tarsomere 2.5 times as long as apical width.

Color. Dorso-outer basal parts of basal first to 13th flagel-

lomeres, dorso-apical parts of basal 14th to 18th flagellomeres, posterior part of second tergite, postero-median part of third tergite and sub-postero median, postero-lateral and lateral sub-anterior to posterior parts of fourth tergite dark brown (Fig. 3A, B).

Distribution. South Korea (new record), Austria, Belarus, Bulgaria, Finland, France, Germany, Latvia, Netherlands, Norway, Poland, Romania, Russia (Primor'ye Kray), Sweden, Turkey, United Kingdom.

Region. Holarctic.

Remarks. Unlike other species of this genus, tapering part of upper valve of ovipositor is 5–7 times longer than height of apical part. Upper part between median and lateral parts of face with yellowish-brown marks (Fig. 3C).

^{2*}Genus *Perithous* Holmgren, 1859

Perithous Holmgren, 1859: 123. TS: *Ephialtes albicinctus* Gravenhorst; TD: IZU.

Perithous (*Hybomischos*) Baltazar, 1961: 49. TS: *Perithous* (*Hybomischos*) *galbus* Baltazar; TD: AEI.

Diagnosis. Second to fifth tergites polished and distinctly punctate, with a white edge part on posterior part.

Key to species of the genus *Perithous* from South Korea

1. Median-lower part of mesopleuron black (Fig. 4G) 2 (Fig. 4)
- Median-lower part of mesopleuron with reddish-brown to brown mark (Fig. 6G) 3 (Figs. 5–7)
2. Mark on upper part of pronotum yellowish-brown and extending from posterior to anterior part *P. scurra japonicus* Uchida, 1928
- Mark on upper part of pronotum pale brown and extending from posterior to median part (Fig. 4G) *P. albicinctus* (Gravenhorst, 1829) (Fig. 4)
3. Central part of mesoscutum with two pale brown to yellowish longitudinal marks (Fig. 6F) *P. speculator* Haupt, 1954 (Fig. 6)
- Central part of mesoscutum reddish-brown; central to anterior part of mesoscutum with pale brown to yellowish-brown curve-shaped mark (Figs. 5D, 7D) 4 (Figs. 5, 7)
4. Mark on median part of propodeum yellowish-brown with curved anterior edge part (Fig. 5D) *P. septemcinctorius* (Thunberg, 1822) (Fig. 5)
- Mark on median part of propodeum pale brown to yellowish-brown with inflectionless anterior edge part (Fig. 7D) *P. townesorum* (Gupta, 1982) (Fig. 7)

Korean name: ^{1*}나방살이주름납작맵시벌(신칭), ^{2*}소요산왜혹납작맵시벌속

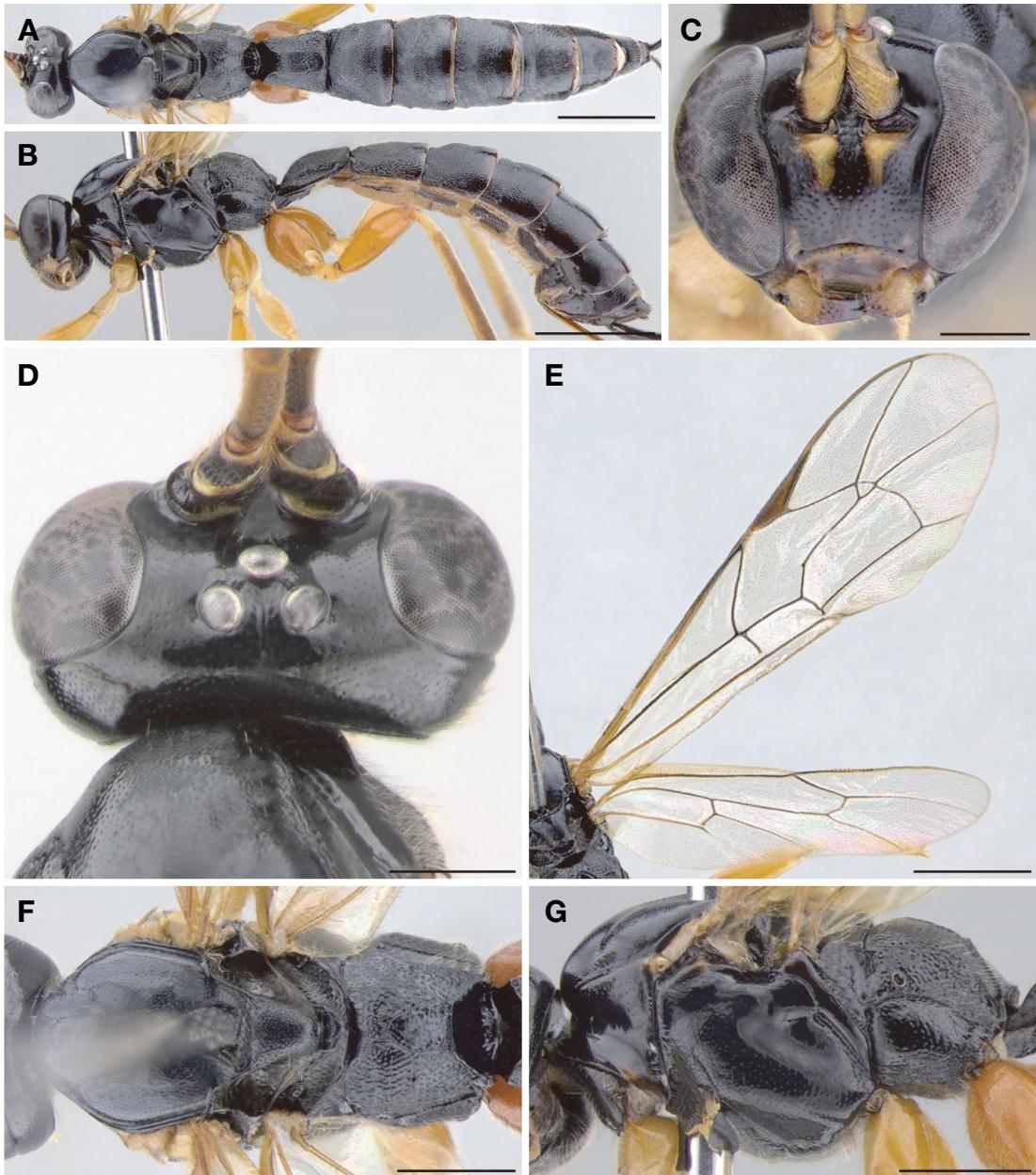


Fig. 3. A-G, *Delomerista pfankuchi* Brauns, 1905, female. A, Habitus in dorsal view; B, Habitus in lateral view; C, Head in frontal view; D, Head in dorsal view; E, Wings; F, Mesosoma in dorsal view; G, Mesosoma in lateral view. Scale bars: A, B, E=2 mm, C, D=0.5 mm, F, G=1 mm.

^{1*}***Perithous albicinctus* (Gravenhorst, 1829) (Fig. 4)**

Ephialtes albicinctus Gravenhorst, 1829: 259. Type: ♀; TL: Germany; TD: IZU.

Ichneumon annulatorius Fabricius, 1775: 330. Holotype: ♂; TL: U.S.A.-Massachusetts; TD: BMNH.

Material examined. South Korea: GG: 3♀, Gwangju-si,

Docheong-myeon, Mt. Taehwasan, alt. 242 m, M.T.II, 37°18'39.1"N, 127°18'21.0"E, 8 Aug-5 Sep 2008, Lim JO; 1♀, Namyangju-si, Mt. Cheonmasan, 28 May 1989, Lee EM; GW: 1♀, Wonju-si, Heungeop-myeon, Maeji-ri, Yonsei Univ., Campus, 24 May 2003, Kim JE, Jeong GE, Yun YS; 2♀, Wonju-si, Heungeop-myeon, Maeji-ri, Yeonse Univ., Wonju campus, M.T., 37°16'53"N, 127°54'02"E, Han HY; 1♀, Won-

Korean name: ^{1*}흰띠소요산왜혹납작맵시벌(신칭)

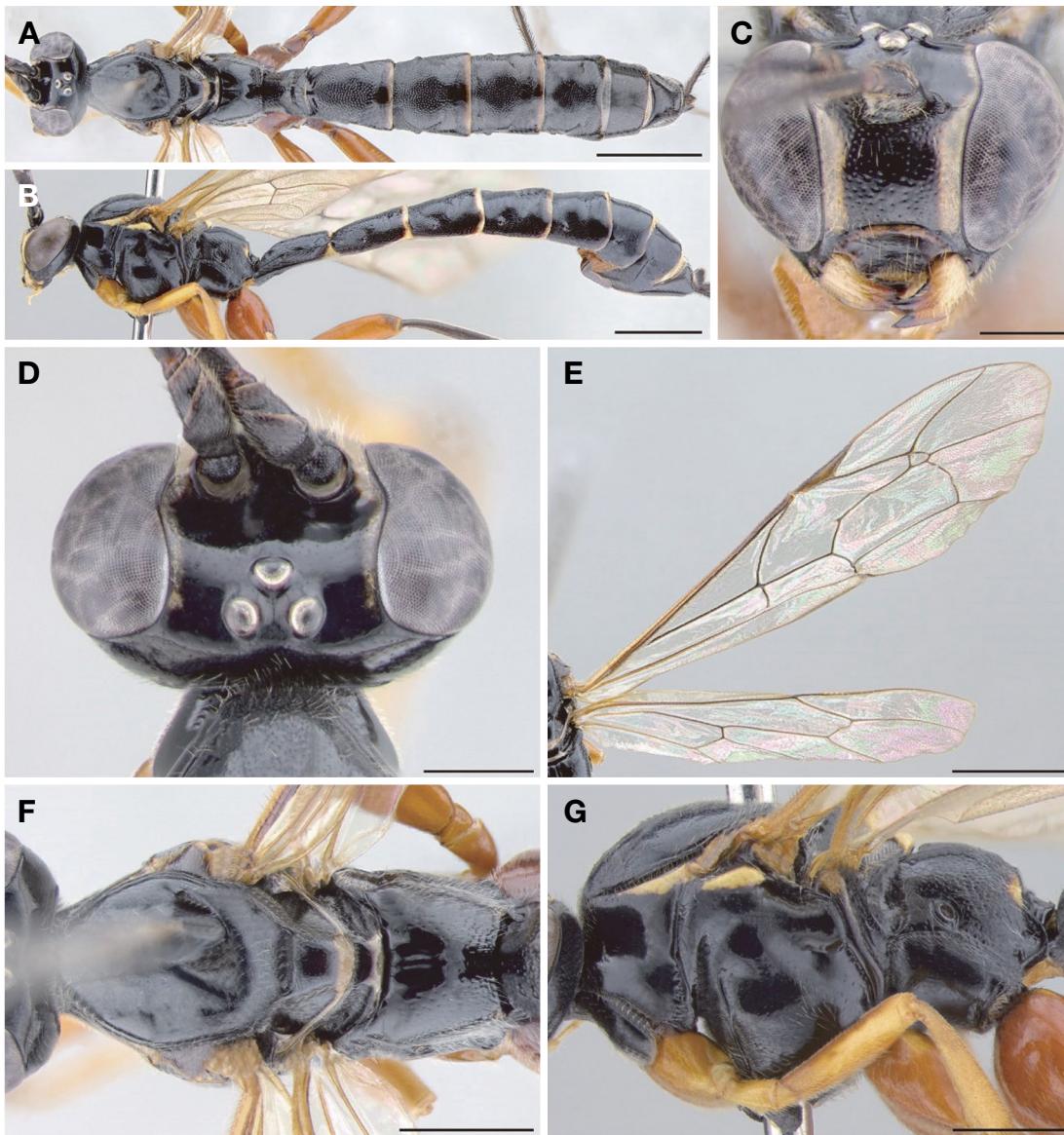


Fig. 4. A–G, *Perithous albicinctus* (Gravenhorst, 1829), female. A, Habitus in dorsal view; B, Habitus in lateral view; C, Head in frontal view; D, Head in dorsal view; E, Wings; F, Mesosoma in dorsal view; G, Mesosoma in lateral view. Scale bars: A, B, E=2 mm, C, D=0.5 mm, F, G=1 mm.

ju-si, Panbu-myeon, Mt. Baekunsan, 37°16'22.87"N, 127°55'58.65"E, 19 Jun–5 Jul 2011, Lee JW; 1♀, Hongcheon-gun, Bukbang-myeon, Gangwon Nature Environment Research Park, 35°45'15.6"N, 127°51'1.7"E, 16–31 Jul 2012, Jang SJ; CB: 2♀, Danyang-gun, Danyang-eup, Mt. Sobaeksan, 36°57'00"N, 128°26'00"E, 25 Jun–9 Aug 2007; 1♀, Danyang-gun, Gagok-myeon Eoeuigok-1ri, Mt. Sobaeksan, 36°58'44.8"N, 128°27'12.7"E, 24 Apr 2004, Park HG, Kim SB, Kim SY, Song JH, Gwon YH; 1♀, Danyang-gun, Cheondong-ri, Mt. Sobaeksan, Bukbusa temple, M.T., 36°52'31.33"N, 127°18'39.32"E, 4 Oct–24 Nov 2005, Lee JW; 1♀, Danyang-gun,

Cheondong-ri, Mt. Sobaeksan, Bukbusa temple, M.T., 7 Jul–2 Aug 2005; GB: 1♀, Pohang-si, Buk-gu, Jukjang-myeon, Haok-ri, 10 Oct 2004; 1♀, Yeongcheon-si, Sinnyeong-myeon, Chisan-ri, San 141-4, Site-40, M.T., 36°01'12.55"N, 128°42'26.29"E, 12 Jun–14 Jul 2014, Lee JW; 1♀, Gunwi-gun, Bugye-myeon, Dongsan-ri, San-75, Site-39, M.T., 36°01'29.4"N, 128°41'31.11"E, 15 Jul–29 Aug 2014, Lee JW; GN: 1♀, Sancheong-gun, Sicheon-myeon, Jirisandae-ro 3, Gyeongsangnamdo Jayeonhakseupwon, 27 Jun 1989; JB: 1♀, Jeongeup-si, Naejang-dong, Mt. Naejangsan, Geumsonggyegok, 35°29'14.58"N, 126°53'37.53"E, M.T., Site-

14, 27 Jul–1 Aug 2008, Lee JW; 1♀, ditto, 6–27 Jul 2008, Lee JW; 1♀, Jeongeup-si, Naejang-dong, Geumseong, Site-15, 35°28'48.9"N, 126°56'32.8"E, 29 Aug 2005; JN: 1♀, Jangseong-gun, Bukha-myeon, Mt. Naejangsan, Baekyangsa temple, 35°26'22.98"N, 126°52'59.85"E, 5–31 Jul 2007, Lee JW; 1♀, Yeongyang-gun, Heomul-ri, Daedongje, M.T., 22 May–31 Jul 2010, Kim JK; Unknown: 1♀, Mt. Gajisan, 27 Jun–3 Jul 1989.

Diagnosis. Anterior part of clypeus with indistinct and transverse ridge. Median part of clypeus indistinctly and transversely concave. Postero-median part of clypeus indistinctly rugose. Postero-lateral part of clypeus distinctly concave (Fig. 4C). Dorso-lateral sub-anterior to posterior and lateral-median to posterior parts of propodeum densely punctate, with dense hairs. Propodeal spiracle of propodeum ellipse shaped and 1.7 times as long as wide. Maximum diameter of propodeal spiracle of propodeum 1.6 times as long as distance between propodeal spiracle and pleural carina (Fig. 4F, G). Hind basitarsus 2.5 times as long as second one. Second hind tarsomere 2.0 times as long as third one. Third hind tarsomere 1.8 times as long as fourth one. Fourth hind tarsomere 0.3 times as long as fifth one. Hind wing with a basal hamulus and 10 distal hamuli. Vein between R₁ and 1rs-m of hind wing distinctly longer than 1rs-m. Cu-a of hind wing intercepted by 2/Cu on upper part (Fig. 4E).

Color. Dorso-apical part except apical-median part, outer-apical part except upper-apical part, inner-basal median, sub-basal upper and sub-apical sub-upper and ventral-apical parts of fore trochanter pale brown (Fig. 4G). Dorso-basal and lateral-basal upper parts of fore femur dark brown (Fig. 4G).

Distribution. South Korea (new record), Austria, Azerbaijan, Belarus, Belgium, Bulgaria, Croatia, Czech Republic, Denmark, Finland, France, Germany, Hungary, Italy, Japan, Latvia, Moldova, Netherlands, Norway, Poland, Romania, Russia (Astrakhanskaya Oblast, Buryatskaya Respublika, Kursk Oblast, Primor'ye Kray), Slovakia, Sweden, Switzerland, Ukraine, United Kingdom.

Region. Holarctic.

Remarks. This species is similar to *P. scurra japonicus* Uchida, 1928. But, mark on upper part of pronotum of this species pale brown and at least extending from posterior to median part (Fig. 4G).

^{1*}*Perithous scurra japonicas* Uchida, 1928

Perithous japonicas Uchida, 1928: 91. Lectotype: ♀; TL: Japan; TD: HU.

Material examined. South Korea: 1♀, Mt. Soyosan, 1 Aug 1935, Doi. Russia: 1♀, Sakhalin, 25 Jul 1924, Uchida T.

Diagnosis. Head smooth, clearly convergent on posterior part in dorsal view. Face sparsely punctate. Mesonotum smooth. Tergite approximately 2.0 times as long as length of head to mesosoma. Third hind tarsomere as long as second hind tarsomere.

Color. Postero-lateral and median parts of fourth tergite yellowish-brown. Lateral-anterior to sub-posterior and postero sub-lateral parts of fourth tergite, and anterior to sub-postero lateral parts of fifth to seventh tergites dark brown. Postero-lateral and median parts of fifth tergite and posterior part of seventh tergite pale brown.

Distribution. South Korea, China (Heilongjiang, Liaoning), Japan, Russia (Sakhalin Oblast).

Region. Eastern Palaearctic.

Remarks. Dissimilarly to *P. albicinctus* (Gravenhorst, 1829), mark on upper part of pronotum of this species is yellowish-brown and extending from posterior to anterior part.

^{2*}*Perithous septemcinctorius* (Thunberg, 1822) (Fig. 5)

Ichneumon septemcinctorius Thunberg, 1822: 280. Lectotype: ♀; TL: Sweden; TD: UU.

Ephialtes varius Gravenhorst, 1829: 254. Lectotype: ♂; TL: Italy; TD: IZU.

Pimpla marginellatoria Dufour & Perris, 1840: 48. Type: unknown; TL: France; TD: lost.

Perithous brunnescens Koornneef, 1951: 244–249. Type: ♀; TL: Netherlands; TD: lost.

Perithous (Perithous) exiguus Haupt, 1954: 108. Type: ♀; TL: Germany; TD: DEI.

Perithous septemcinctorius meridionator Aubert, 1963: 847–878. Type: unknown; TL: France; TD: unknown.

Perithous (Hybomischos) septemcinctorius rufatus Constantineanu & Constantineanu, 1968: 228–258. Type: unknown; TL: Romania; TD: unknown.

Material examined. South Korea: GW: 1♀, Hongcheon-gun, Bukbang-myeon, Gangwon Nature Environment Research Park, 37°45'15.6"N, 127°51'1.7"E, 3–15 Oct 2013, Jang SJ.

Diagnosis. Postero-median part of clypeus indistinctly and transversely concave (Fig. 5C). Dorso-median and Postero-lateral and lateral-median parts of propodeum densely punctate, with dense hairs. Propodeal spiracle of propodeum ellipse shaped and 1.5 times as long as wide. Maximum diameter of propodeal spiracle of propodeum 1.9 times as long as distance between propodeal spiracle and pleural carina (Fig. 5D). Hind basitarsus 2.3 times as long as second one. Second hind tarsomere 1.7 times as long as third one. Third hind tarsomere 1.5 times as long as fourth one. Fourth hind tar-

Korean name: ^{1*}소요산왜흑납작맵시벌, ^{2*}일곱띠소요산왜흑납작맵시벌(신칭)

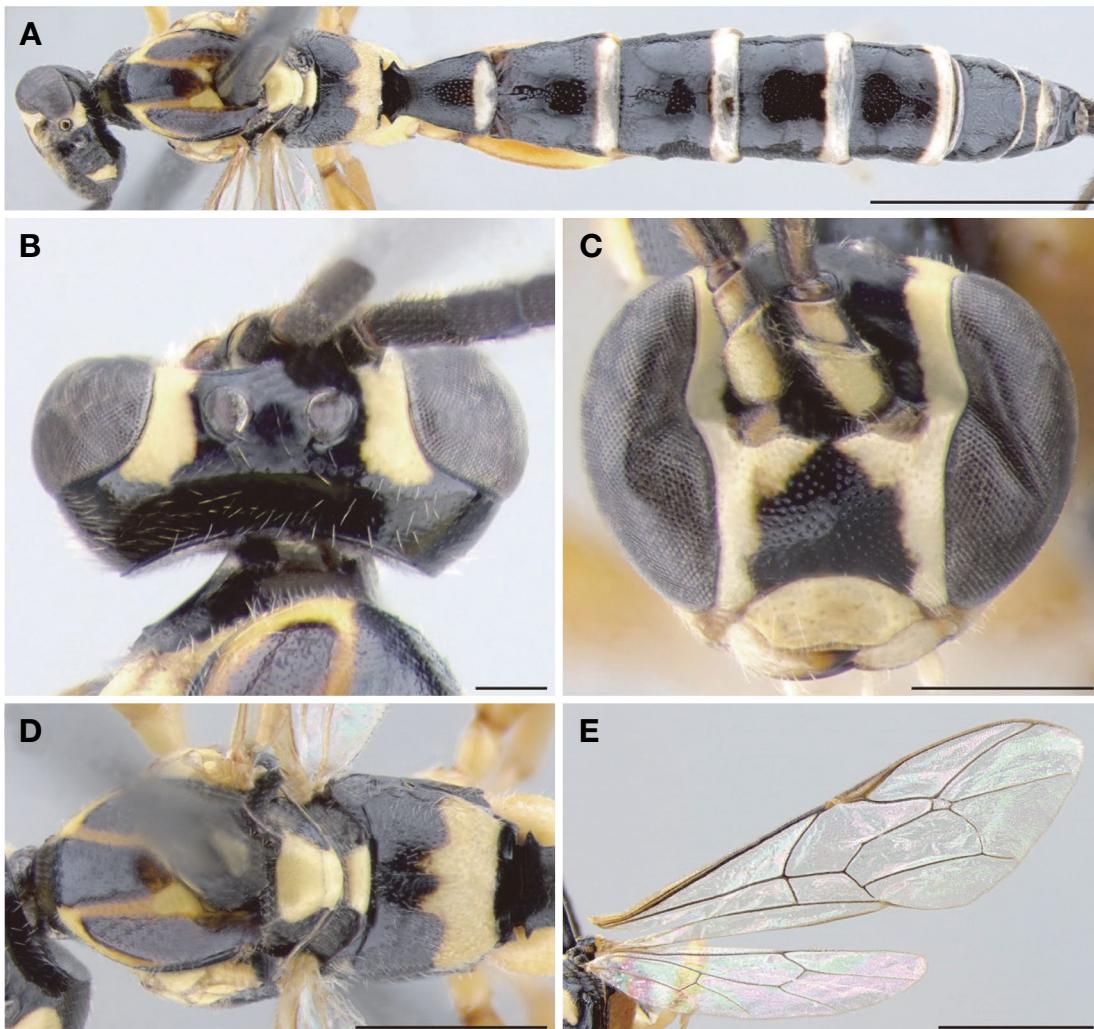


Fig. 5. A–E, *Perithous septemcinctarius* (Thunberg, 1822), female. A, Habitus in dorsal view; B, Head in dorsal view; C, Head in frontal view; D, Mesosoma in dorsal view; E, Wings. Scale bars: A, E=2 mm, B=0.2 mm, C=0.5 mm, D=1 mm.

mere 0.3 times as long as fifth one. Hind wing with a basal hamulus and eight distal hamuli. Vein between R₁ and 1rs-m of hind wing approximately as long as 1rs-m. Cu-a of hind wing intercepted by 2/Cu on median part (Fig. 5E).

Color. Apical part of fore trochanter whitish. Dorso-basal, median lateral and apical and lateral-basal upper and apical upper parts of fore femur brown.

Distribution. South Korea (new record), Austria, Azerbaijan, Belarus, Belgium, Bulgaria, China (Liaoning, Shanxi, Xinjiang), Croatia, Czech Republic, Finland, France, Georgia, Germany, Hungary, Iran, Ireland, Italy, Kazakhstan, Lithuania, Macedonia, Moldova, Netherlands, Norway, Poland, Romania, Russia (Adygeyskaya, Astrakhanskaya Oblast, Kirov Oblast, Sankt Petersburg, Yaroslavl Oblast), Serbia and

Montenegro, Slovakia, Spain, Sweden, Switzerland, Turkey, U.S.A., Ukraine, United Kingdom, Yugoslavia.

Region. Holarctic, Nearctic.

Remarks. This species is similar to *P. townesorum* (Gupta, 1982). However, mark on median part of propodeum of this species is yellowish-brown with curved anterior edge part (Fig. 5D).

^{1*}*Perithous speculator* Haupt, 1954 (Fig. 6)

Perithous (*Perithous*) *speculator* Haupt, 1954: 109. Type: ♀; TL: Germany; TD: DEI.

Perithous (*Perithous*) *speculator transylvanicus* Constantineanu & Constantineanu, 1968: 228–258. Type: ♀; TL: Romania; TD: unknown.

Korean name: ^{1*}줄무늬소요산왜혹납작맵시벌(신칭)

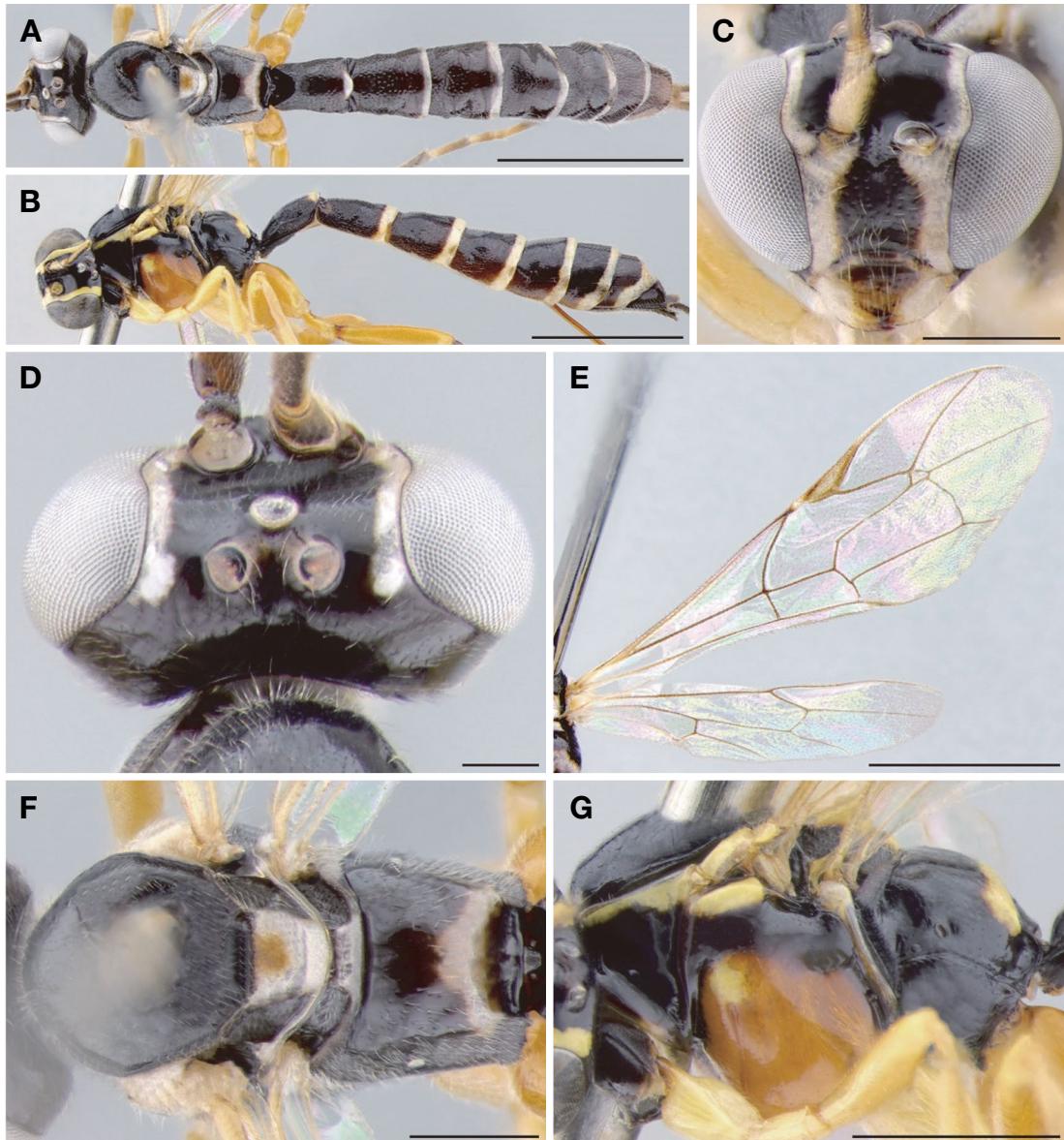


Fig. 6. A–G, *Perithous speculator* Haupt, 1954, female. A, Habitus in dorsal view; B, Habitus in lateral view; C, Head in frontal view; D, Head in dorsal view; E, Wings; F, Mesosoma in dorsal view; G, Mesosoma in lateral view. Scale bars: A, B, E=2 mm, C, F=0.5 mm, D=0.2 mm, G=1 mm.

Material examined. South Korea: Seoul: 1♀, Seongbuk-gu, Jangwi-dong, 25 Aug 1980, Kim JI; GB: 1♀, Pohang-si, Buk-gu, Cheonha-myeon, Yugye-ri, 29 May 2004; 1♀, Gyeongju-si, Hyeongok-myeon, Namsa-ri, M.T.II, 35°54'31.04"N, 129°07'39.80"E, 2–8 Sep 2005, Mun TJ; 1♀, Gyeongsan-si, Dae-dong, Yeungnam Univ., M.T., 35°58'N, 128°47' E, 7–11 May 2007; JN: 2♀, Yeongyang-gun, Heomul-ri, Daedongje, M.T., 22 May–31 Jul 2010, Kim CK.

Diagnosis. Median part of clypeus indistinctly and transversely concave (Fig. 6C). Dorso-lateral median to posterior

and lateral-median to posterior parts of propodeum densely punctate, with dense hairs. Propodeal spiracle of propodeum ellipse shaped and 3.2 times as long as wide. Maximum diameter of propodeal spiracle of propodeum 1.1 times as long as distance between propodeal spiracle and pleural carina (Fig. 6F, G). Hind basitarsus 2.0 times as long as second one. Second hind tarsomere 1.6 times as long as third one. Third hind tarsomere 2.0 times as long as fourth one. Fourth hind tarsomere 0.4 times as long as fifth one. Hind wing with a basal hamulus and seven distal hamuli. Vein between

R1 and 1rs-m of hind wing approximately as long as 1rs-m. Cu-a of hind wing intercepted by 2/Cu on upper part (Fig. 6E).

Color. Dorso-apical median, lateral-upper and lower apical and ventral-apical parts of fore trochanter and basal part of fore femur brown (Fig. 6G).

Distribution. South Korea (new record), Austria, Bulgaria, France, Germany, Norway, Poland, Romania, Russia (Primor'ye Kray), Sweden, United Kingdom.

Region. Holarctic.

Remarks. Unlike *P. townesorum* (Gupta, 1982) and *P. septemcinctarius* (Thunberg, 1822), central part of mesoscutum of this species with two pale brown to yellowish longitudinal marks (Fig. 6F).

^{1*}*Perithous townesorum* (Gupta, 1982) (Fig. 7)

Hybomischos townesorum Gupta, 1982: 3. Holotype: ♀; TL: Japan; TD: AEI.

Material examined. South Korea: GW: 1♀, Hongcheon-gun, Bukbang-myeon, Gangwon Nature Environment Research Park, 37°45'15.6"N, 127°51'1.7"E, 1–17 Jun 2013, Jang SJ; 1♀, ditto, 15–30 Jun 2012, Jang SJ; GB: 1♀, Bonghwa-gun, Chunyang-myeon, Seokhyeon-ri, San 126-1, 1 Jun 2019, Choi MJ.

Diagnosis. Posterior part of clypeus indistinctly and transversely concave (Fig. 7C). Median part of propodeum densely punctate, with dense hairs. Propodeal spiracle of propodeum circle shaped and 1.8 times as long as wide. Maximum diameter of propodeal spiracle of propodeum 1.8 times as long as distance between propodeal spiracle and pleural carina (Fig. 7D). Hind basitarsus 2.1 times as long as second one. Second hind tarsomere 1.8 times as long as third one. Third hind tarsomere 1.3 times as long as fourth one. Fourth hind tarsomere 0.4 times as long as fifth one. Hind wing with a basal hamulus and six distal hamuli. Vein between R1 and 1rs-m of hind wing approximately as long as 1rs-m. Cu-a of hind wing intercepted by 2/Cu on median part (Fig. 7E).

Color. Dorso-apical median and lateral-upper apical parts of fore trochanter brown. Dorso and lateral-apical and ventral-lateral apical and median to apical parts of fore femur pale yellowish.

Distribution. South Korea (new record), Japan.

Region. Eastern Palaearctic.

Remarks. This species is similar to *P. septemcinctarius* (Thunberg, 1822). But, mark on median part of propodeum of this species is pale-brown to yellowish-brown with inflectionless anterior edge part (Fig. 7D).

^{2*}Tribe Ephialtini Hellén, 1915

^{3*}**Genus *Iseropus* Förster, 1869**

Iseropus Förster, 1869: 164. TS: *Ichneumon graminellae* Schrank; Type: lost.

Cnemopimpla Cameron, 1903: 159. TS: *Cnemopimpla pilosa* Cameron; TD: BMNH.

Diagnosis. Ventral part of flagellomere reddish. Posterior angle of pronotum barely reddish or black. Stigma black. The nervellus of hind wing intercepted above the middle. Hind tibia and tarsomere whitish; hind tibia with dark apical part and dark band on basal part; segment of hind tarsomere dark on apical part. Ovipositor sheath 0.5–0.7 times longer than tergite.

Key to species of the genus *Iseropus* from South Korea

1. All coxae reddish. Hind femur not black on apical part (Fig. 8A).....*I. stercorator stercorator* (Fabricius, 1793) (Fig. 8)
- All coxae black (except for apical part). Hind femur black on apical part.....*I. orientalis* Uchida, 1928

^{4*}***Iseropus orientalis* Uchida, 1928**

Iseropus orientalis Uchida, 1928: 57. Lectotype: ♀; TL: Japan; TD: HU.

Iseropus epicnapterus Uchida, 1928: 58. Lectotype: ♀; TL: Japan; TD: HU.

Material examined. South Korea: GG: 1♀, Gapyeong-gun, Suyanggwan, 3 Sep 1999, Ryu SM.

Diagnosis. Clypeus 0.6 times as long as wide, slightly polished and densely punctate, with dense hairs. Sub-anterior part of clypeus indistinctly and transversely convex. Central part of pronotum sparsely punctate, with sparse hairs. Postero-lower part of pronotum distinctly and longitudinally rugose. Antero-median and postero-median parts of mesopleuron sparsely punctate, with sparse hairs. Dorso-lateral anterior to median and lateral parts of propodeum densely punctate, with dense hairs.

Color. Postero-upper part of pronotum brown. Apical part of mid trochanter pale brown. Antero sub-lateral part of second tergite, antero-lateral part of third tergite, postero-median parts of first to third and sixth to seventh tergites and postero-lateral parts of third to sixth tergites dark brown.

Distribution. South Korea, Japan, Russia (Amur Oblast, Sakhalin Oblast).

Region. Eastern Palaearctic.

Remarks. Unlike other species of this genus, coxa except apical part and apical part of hind femur are black.

Korean name: ^{1*}얇은굴곡소요산왜혹납작맵시벌(신청), ^{2*}어리황다리납작맵시벌족, ^{3*}배가시납작맵시벌속, ^{4*}배가시납작맵시벌

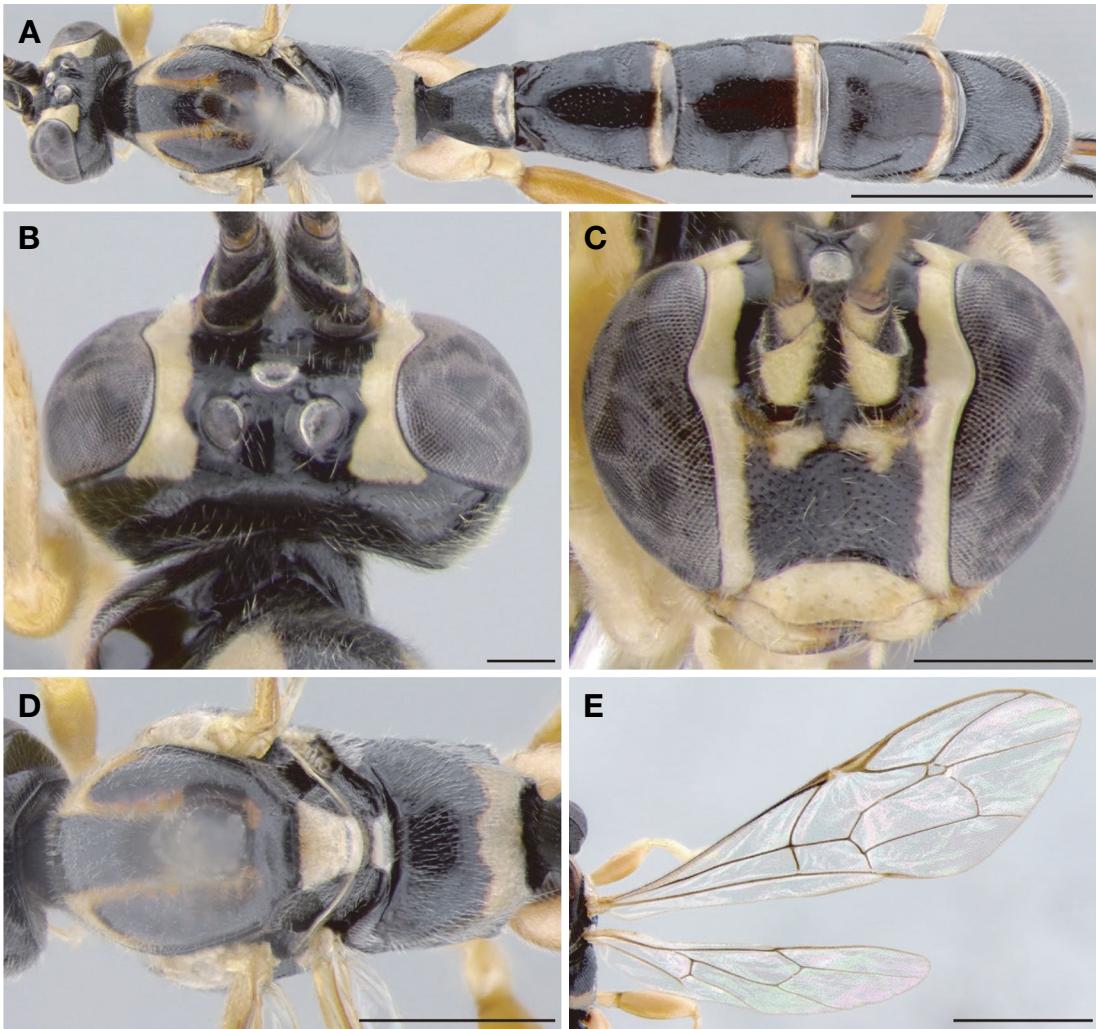


Fig. 7. A-E, *Perithous townesorum* (Gupta, 1982), female. A, Habitus in dorsal view; B, Head in dorsal view; C, Head in frontal view; D, Mesosoma in dorsal view; E, Wings. Scale bars: A, E=2 mm, B=0.2 mm, C=0.5 mm, D=1 mm.

^{1*}*Iseropus stercorator stercorator* (Fabricius, 1793)

(Fig. 8)

Ichneumon inquisitor Scopoli, 1763: 286. Type: ♀; TL: Unknown; TD: lost.

Ichneumon visitator Scopoli, 1763: 285. Primary homonym
Ichneumon visitator Poda, 1761; Type: unknown.

Ichneumon scanicus Geoffroy, 1785 in Fourcroy, 1785: 416.
Type: unknown; TL: unknown; TD: unknown.

Ichneumon albipes Gmelin, 1790: 2701. Primary homonym
Ichneumon albipes Geoffroy, 1785; Type: unknown.

Ichneumon aurifrons Gmelin, 1790: 2702. Type: unknown;
TL: unknown; TD: unknown.

Ichneumon variegatus Gmelin, 1790: 2701. Primary homonym
Ichneumon variegatus Schrank, 1785; Type: un-

known.

Ichneumon perquisitor Olivier, 1792: 133–224. Emendation
for *Ichneumon inquisitor* Scopoli, 1763; Type: unknown.

Ichneumon pennator Fabricius, 1793: 155. Lectotype: ♀;
TL: Germany; TD: UZM.

Ichneumon stercorator Fabricius, 1793: 172. Lectotype: ♂;
TL: Germany; TD: UZM.

Ichneumon graminellae Schrank, 1802: 301. Type: ♀; TL:
Czechoslovakia; TD: lost.

Pimpla mussii Hartig, 1838: 253. Type: ♂; TL: Germany;
TD: lost.

Pimpla holmgreni Schmiedeknecht, 1888: 502. Lectotype:
♀; TL: Germany; TD: ZMHU.

Itoplectis orgyiae Ashmead, 1896: 213. Type: unknown; TL:

Korean name: ^{1*}붉은다리배가시납작맵시벌(신칭)

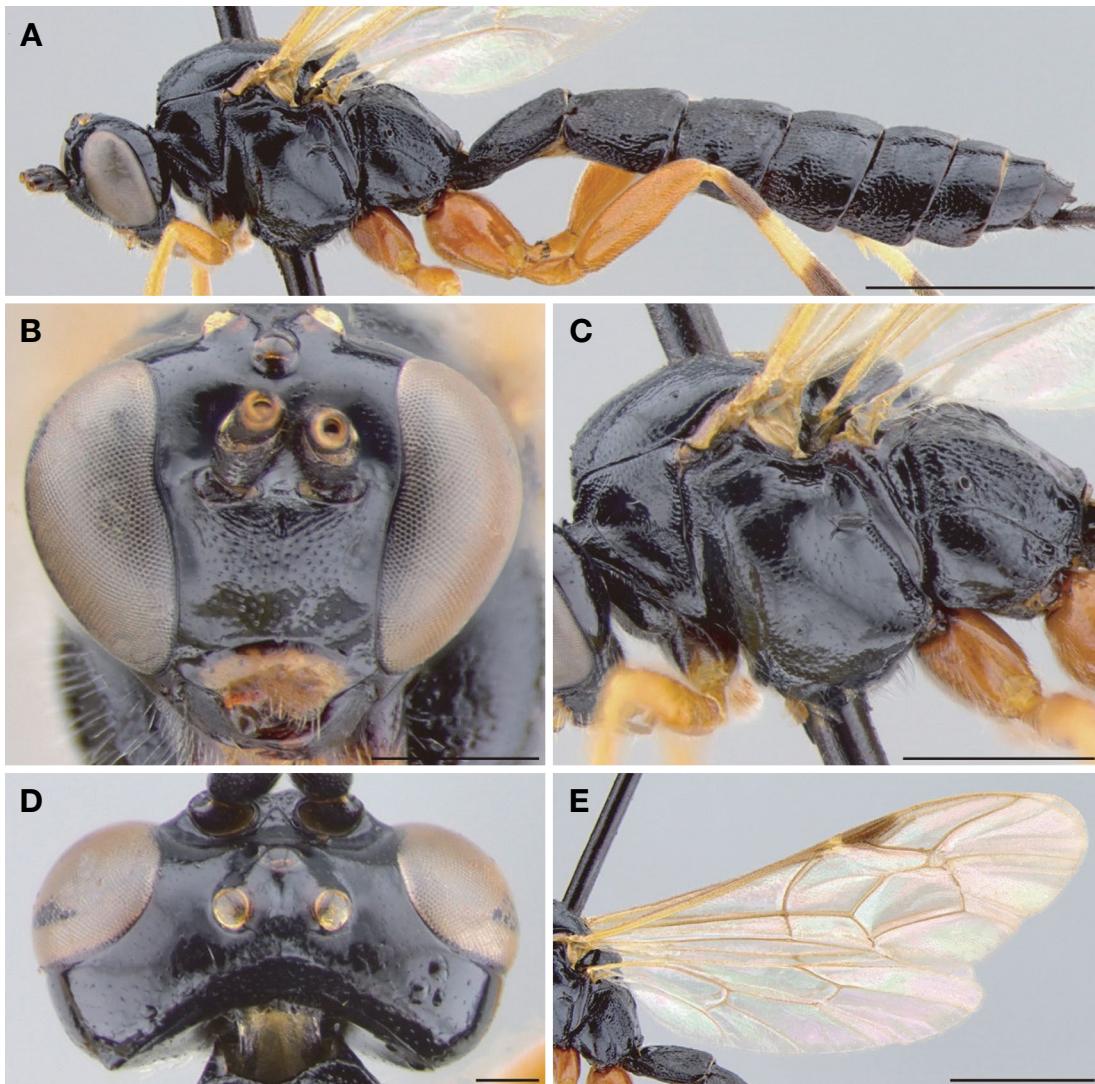


Fig. 8. A-E, *Iseropus stercorator stercorator* (Fabricius, 1793), female. A, Habitus in lateral view; B, Head in frontal view; C, Mesosoma in lateral view; D, Head in dorsal view; E, Wings. Scale bars: A, E=2 mm, B=0.5 mm, C=1 mm, D=0.2 mm.

U.S.A.-California; TD: USNM.

Pimpla (*Epiurus*) *bruneifrons* Viereck, 1909: 290–292. Type: unknown; TL: U.S.A.-California; TD: USNM.

Iseropus bruneifrons septentrionalis Cushman, 1940: 51–58. Type: ♀; TL: U.S.A.-Michigan; TD: USNM.

Material examined. South Korea: Seoul: 1♂, Nowon-gu, Mt. Suraksan, 27 May 1995, Jo SE. Germany: 1♂, Hannover, 29 Jul 1951; 1♀, Celle, 25 May 1942.

Diagnosis. Median to upper part of inner orbits and upper part of frons densely punctate, with dense hairs. Lower-lateral part of frons smooth (Fig. 8B). Clypeus 0.4 times as long as wide, polished and sparsely punctate, with sparse hairs. Postero-median part of clypeus densely punctate, with dense

hairs. Median part of clypeus with indistinct and transverse ridge. Postero-median part of clypeus indistinctly concave (Fig. 8B). Central to median-lower and postero-lower parts of pronotum sparsely punctate, with sparse hairs. Postero-median to sub-lower part of pronotum distinctly and transversely rugose (Fig. 8C). Postero-median part of mesopleuron sparsely punctate, with sparse hairs (Fig. 8C). Dorso-median and lateral-anterior parts of propodeum densely punctate, with dense hairs (Fig. 8C).

Color. Sub-postero lower and postero-upper parts of pronotum, antero-lateral parts of second to fourth tergites, postero-lateral and median parts of fifth tergite and postero-aterior parts of sixth to eighth tergites dark brown (Fig. 8C). Dorso-lateral and apical median, lateral-lower basal to sub-apical

and upper and ventral-basal to sub-apical parts of mid trochanter reddish brown (Fig. 8A).

Distribution. South Korea (new record), Algeria, Armenia, Austria, Belarus, Belgium, Bulgaria, Canada, China (Xinjiang), Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Hungary, Iran, Ireland, Italy, Japan, Kazakhstan, Latvia, Lithuania, Moldova, Mongolia, Netherlands, Norway, Poland, Romania, Russia (Amur Oblast, Astrakhan-skaya Oblast, Irkutsk Oblast, Kaliningrad Oblast, Kamchatka Oblast, Khabarovsk Kray, Kursk Oblast, Magadanskaya Oblast, Novosibirsk Oblast, Penza Oblast, Perm Oblast, Primor'ye Kray, Sakhalin Oblast, Samarskaya Oblast, Sankt Petersburg, Saratov Oblast, Tambov Oblast, Voronezhskaya Oblast, Yakutskaya Republika, Yaroslavl Oblast), Spain, Sweden, Switzerland, Turkey, U.S.A., Ukraine, United Kingdom, Uzbekistan.

Region. Holarctic, Nearctic.

Remarks. This species is similar to *I. orientalis* Uchida, 1928. But, hind coxa and femur of this species are reddish-brown (Fig. 8A).

ORCID

Geun-Myeong Song: <https://orcid.org/0000-0003-1426-7462>

Jin-Kyung Choi: <https://orcid.org/0000-0002-4059-0645>

Jong-Wook Lee: <https://orcid.org/0000-0002-8684-3935>

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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